Abstracts

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E. MAEKAWA and T. KOSHIJIMA: **Wood Polysaccharides Dissolved into the Liquor in the Process of Chlorite Delignification of Akamatsu (Pinus densiflora) Wood Meal I. Polysaccharide Components Dissolved into Chlorite Liquor According to the Variation of Treating conditions.** Zairyo, **28**, 665 (1979)

Polysaccharide components dissolved into chlorite liquor under various treating conditions in the process of delignification with acidic sodium chlorite at 70°C were investigated for Akamatsu wood meal.

The determination of lignin contents in the residual meal treated with sodium chlorite showed that the acid soluble portion of the remaining lignin was maximum at near 50% delignification.

The polysaccharide components were isolated as precipitates from the solution by adding ethanol, and their carbohydrate compositions and contents were analyzed and determined by means of gas liquid chromatography after changing them into alditol acetates. The results revealed that the amounts of galactose and arabinose residues were rich in the polysaccharide fractions isolated from the solution at the early stage of delignification and furthermore the residues of mannose, glucose and xylose increased with progress of the delignification, while those of galactose and arabinose decreased.

A. SATO: **Utilization of Wood Waste and Residues in the Philippines —Destruction of Refractory Bricks**—New Lumberman No. **32**, 1 (1979) (in Japanese)

The investigation for wood waste and residues in the Philippines was done by the author. Much difference of ash contents from woods and barks was recognized experimentally due to species. The troubles on destruction of refractory bricks which are used as inner-wall of brak-boilers are discussed with relation to the ash contents. Some analytical data and several pictures from Eastern Mindanao Island are also shown.

K. TANAKA, F. NAKATSUBO and T. HIGUCHI: **Reactions of Guaiacylglycerol-β-Guaiacyl Ether with Several Sugars. II. Reactions of Quinonemethide with Pyranohexoses.** Mokuzai Gakkaishi, **25**, 653 (1979)

To elucidate the formation of lignin-carbohydrate complex (L.C.C.), the addition reactions of quinonemethides (Q.M.), which are formed during dehydrogenative polymerization of lignin monomers, with monosaccharides were examined. Both D-glucose and D-glucuronic acid reacted with the quinonemethide of guaiacylglycerol-β-guaiacyl ether, and the resultant products were isolated and identified. It was found that D-glucose is connected via an ether linkage at C_6, whereas D-glucuronic acid is

connected via an ester linkage at C_6. Quantitative examinations of the addition reactions in the presence of water showed that D-glucuronic acid reacted with quinonemethide markedly, whereas D-glucose reacted a little, The results showed that similar addition reactions of quinonemethide with monosaccharides are possible to occur *in vivo*.

M. OHTA, T. HIGUCHI and S. IWAHARA: **Microbial Degradation of Dehydrodiconiferyl Alcohol, a Lignin Substructure Model.** Arch. Microbiol., **121**, 23 (1979)

Bacteria, yeasts, and molds which grew in a medium containing a synthetic lignin —a dehydrogenation polymer (DHP) of coniferyl alcohol—as a sole carbon source, were isolated from soil. One fungus, *Fusarium solani* M-13-1, was found to degrade the DHP most vigorously among the isolated organisms. It was shake-cultured in a medium containing dehydrodiconiferyl alcohol (DHCA) (I), an important lignin model compound, and the following six metabolic products were isolated and identified: 1) Phenylcoumaran-γ'-aldehydic (II) and γ'-carboxylic (III) compounds, 2) phenylcoumaran-α'-aldehydic compound (IV), formed by release of a 2-carbon fragment from the phenylcoumaran-γ'-carboxylic compound, 3) 5-acetylvanillyl alcohol (V), formed by cleavage of the coumaran ring and reduction of the γ'-aldehyde group, 4) 5-carboxyvanillyl alcohol (VI), formed by subsequent oxidation of the acetyl group, and 5) the γ'-ether of DHCA (VII), considered to be a by-product. A degradation pathway for DHCA was proposed on the basis of these metabolic products.

E. E. CONN, I. J. MCFARLANE, B. L. MØLLER and M. SHIMADA: **Channeling of Intermediates During the Biosynthesis of Cyanogenic Glycosides**, FEBS Federation of European Biochemical Societies Meeting Vol. 55, "Regulation of secondary product and plant hormone metabolism." Ed. M. Luckner and K. Shreiber, p. 63 (1979). Pergamon press N.Y.

The enzymes in sorghum seedlings which catalyze all except the last step in the biosynthesis of dhurrin are contained in a membrane-bound (microsomal) fraction. Four lines of evidence suggest that these microsomal enzymes may be arranged as a complex which efficiently channels the flow of carbon from L-tyrosine into dhurrin. First, the membrane preparation catalyzes the multi-step conversion of L-tyrosine to p-hydroxymandelonitrile. Second, each individual step of the reaction sequence can be demonstrated but the conditions necessary for this demonstration vary. Third, kinetic analysis shows that the particles preferentially utilize tyrosine and p-hydroxyphenylacetaldoxime (aldoxime) instead of p-hydroxyphenylacetonitrile (nitrile), a late intermediate, in the reaction sequence. Four, ^{3}H-aldoxime and ^{3}H-nitrile produced from ^{3}H-tyrosine by the membrane-bound biosynthetic enzymes do not readily

equilibrate with ^{14}C-aldoxime or ^{14}C-nitrile incubated simultaneously with the particles, but instead are preferentially converted to ^{3}H-p-hydroxymandelonitrile.

Z. W. NAM, S. HAYASHI and S. ISHIHARA: **Properties of Fiberboard Made from Asplund Pulp-PMMA Composite**, J. of The Soc. of Materials Sci. Japan, **28**, No. 310, 647 (1979).

In order to improve the mechanical and physical properties of fiberboard, the graft copolymerization of methyl methacrylate (MMA) onto wood fiber (Lauan Asplund pulp) was investigated, and the effects of the grafting on the dimensional stability and strength properties of the fiberboard prepared from Asplund pulp-MMA graft copolymer were examined.

The results are as follows:

(1) It was found that H_2O_2-Fe(II) redox initiation system was very effective for the graft copolymerization and MMA was grafted onto the inner part of wood fiber, mainly on carbohydrate in the early stage of the reaction, and on lignin in later. The molecular weight (Mn) of poly (methyl methacrylate) branches of graft copolymer was in the range of $6.5 \times 10^5 \sim 9.5 \times 10^5$ and somewhat higher than that of homo polymer.

(2) The dimensional change of the fiberboard made from Asplund pulp-MMA graft copolymer in humidity or watersoak tests decreased with increasing degree of grafting, and the thickness swelling of the grafted board (PMMA content: 15.5%) was less than 8% at 40°C and 90% relative himidity, or less than 15% in watersoak for 24 hours. The decrease of dimensional change was considered as resulted from the dimensional stability of each wood fiber much more than the increase of bonding strength between the grafted wood fiber.

(3) The modulus of rupture and the modulus of elasticity of the fiberboard made from Asplund pulp-MMA graft copolymer in bending increased with increasing degree of grafting, but the effect by MMA grafting was not so much as that by urea- or phenol-formaldehyde resin.

T. HAYASHI, M. MASUDA and H. SASAKI: **Rotating Bending Fatigue Properties of Timber Butt-Joint with Metal Plate Connectors**, J. of The Soc. of Materials Sci. Japan, **28**, No. 310, 623 (1979).

Rotating bending fatigue tests were carried out on the timber joints of air-dried, water-saturated or moisture-cycled specimens. The effects of moisture content and moisture cycling on the fatigue properties of the joints were discussed with considering the failure modes of the joints and the strain distribution in the metal plate connector.

The results obtained are as follows;

(1) The relationship between the applied bending moment and the cycles to failure was expressed as a single continuous curve. The fatigue limit of air-dried and

water-saturated specimens are 9% and 11% of the static strength, respectively.

(2) The failure modes of joints in fatigue tests could be divided into three categories. All teeth were pulled out of the wood block at relatively high moment levels, but they were sheared off at the root of teeth at relatively low moment levels. At intermediate moment levels, some were pulled out and the rest were sheared off.

(3) The fatigue strength of the joints was much influenced by the pre-treatments of moisture cycling, while the static strength was rather insensitive to the treatments.

S. P. TAKINO, Z. W. NAM and T. MAKU: **Properties of Board Made from Asplund Pulp-Methyl Methacrylate Graft Copolymer (2); The Dimensional Stability and Strength Properties**, Mokuzaikenkyushiryo (Wood Research Review), No. 13, 59 (1979).

The mechanical and strength properties of the fiberboard made from Asplund pulp-MMA graft copolymer have been investigated. The dimensional stability and strength properties of the board were highly influenced by the density and pressing conditions.

Generally, the dimensional stability in water soak increased with increasing precent grafting, but the strength properties (bending strength, etc.) did not increase with increasing PMMA content so much as the dimensional stability.

H. SASAKI and S. P. TAKINO: **Properties of Hinoki from the Thinning Operation for Structural Use**, Mokuzaikenkyushiryo (Wood Research Review), No. 13, 47 (1979).

Properties of Hinoki from the thinning operation for structural use are described as compared with those of Hinoki from the regeneration-cutting and Western Hemlock on the market.

K. TSUNODA and K. HISHIMOTO: **Shipworm Attack in the Sea Water Log Storage Area and its Prevention (1)—Japanese Shipworms and Their Distribution**, Mokuzai Kogyo, **34** (7), 14 (1979). (in Japanese)

The *Teredinidae* (commonly called shipworms) are widely distributed along the coasts of Japan. Nine of 17 species belonging to 6 genera recognized as Japanese shipworms were found in the test panels sumberged recently in the sea.

Of these *Teredo navalis* and *Lyrodus pedicellatus* are very destructive to the logs stored in Japanese waters. It seems that warmer parts (*e.g.* Shikoku, Kyushu) are more severely infested with shipworms because of higher water temperatures through the year.

K. NISHIMITO: **—Lecture— Characteristics of Wood 5. Wood Deterioration and Its Prevention**, Zairyo (J. Soc. Mater. Sci., Japan), **28**, 313 (1979). (in Japanese)

The causes of the biodeterioration of wood (attack by fungi, stains and insects on wood)are explained for better understanding. The methods preventing their attacks are also briefly outlined.

K. TSUNODA and K. NISHIMOTO: **Growth Rates of the Shipworm *Teredo navalis* L. at Naruto, Tokushima Pref., Japan**, Material und Organismen, **13**, 287 (1978).

The growth rates of *Teredo navalis* L. boring into Douglas fir test blocks were determined directly from the lengths of burrows on X-ray photographs taken at regular intervals. The rates of growth varied with water temperatures and the extent of crowding. The average rates ranged from 13 mm per month for one month old specimens to 48 mm for 3 months old ones. Some specimens consequently exceeded 200 mm in length within 5 months. The optimum water temperatures for the growth of *Teredo navalis* seemed to lie between 15° and 25°C as evident from the rapid growth at the test site (Naruto, Tokushima Pref., Japan; 34° 12' 30'' N, 134° 36' 27'' E) in September, October, November and December, and the abrupt decline of growth in the winter season with water temperatures below 10°C.